Sea-Bird Electronics, Inc.

13431 NE 20th Street, Bellevue, WA 98005-2010 USA

Phone: (+1) 425-643-9866 Fax (+1) 425-643-9954 Email: seabird@seabird.com

SENSOR SERIAL NUMBER: 9235
CALIBRATION DATE: 17-Sep-14

Slocum Payload CTD PRESSURE CALIBRATION DATA
FSR: 1450 psia S/N 4233472

COEFFICIENTS:

PA0 =	1.559447e-001	PTCA0 =	5.232477e+005
PA1 =	4.531086e-003	PTCA1 =	3.250209e+000
PA2 =	-1.284814e-011	PTCA2 =	-7.782236e-002
PTEMPA0 =	-7.414059e+001	PTCB0 =	2.534013e+001
PTEMPA1 =	4.963390e-002	PTCB1 =	-1.750000e-004
PTEMPA2 =	-3.433862e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE PSIA	INST OUTPUT	THERMISTOR OUTPUT	COMPUTED PRESSURE	ERROR %FS
14.50	526459.0	1984.0	14.56	0.00
314.79	592707.0	1990.0	314.72	-0.00
614.74	658945.0	1990.0	614.72	-0.00
914.80	725230.0	1992.0	914.83	0.00
1214.74	791494.0	1992.0	1214.72	-0.00
1464.73	846742.0	1992.0	1464.68	-0.00
1214.73	791509.0	1992.0	1214.79	0.00
914.74	725223.0	1992.0	914.80	0.00
614.80	658959.0	1992.0	614.79	-0.00
314.82	592719.0	1992.0	314.77	-0.00
14.50	526448.0	1993.0	14.51	0.00

THERMAL CORRECTION

TEMP ITS90	THERMISTOR OUTPUT	INST OUTPUT
32.50	2182	526498.75
29.00	2109	526508.25
24.00	2005	526514.00
18.50	1891	526510.00
15.00	1819	526505.75
4.50	1602	526492.75
1.00	1530	526480.00

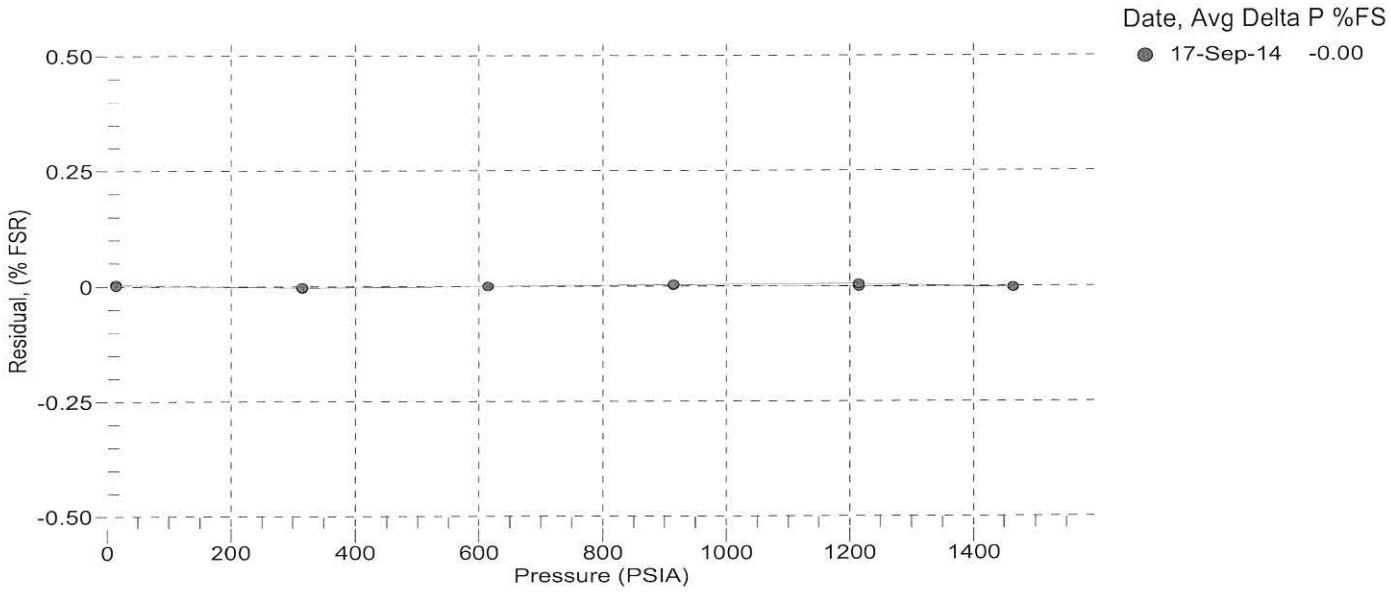
TEMP (ITS90)	SPAN (mV)
-5.00	25.34
35.00	25.33

y = thermistor output; $t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$

x = pressure output - $PTCA0 - PTCA1 * t - PTCA2 * t^2$

$n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$

pressure (psia) = $PA0 + PA1 * n + PA2 * n^2$



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SENSOR SERIAL NUMBER: 9235
CALIBRATION DATE: 23-Sep-14

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

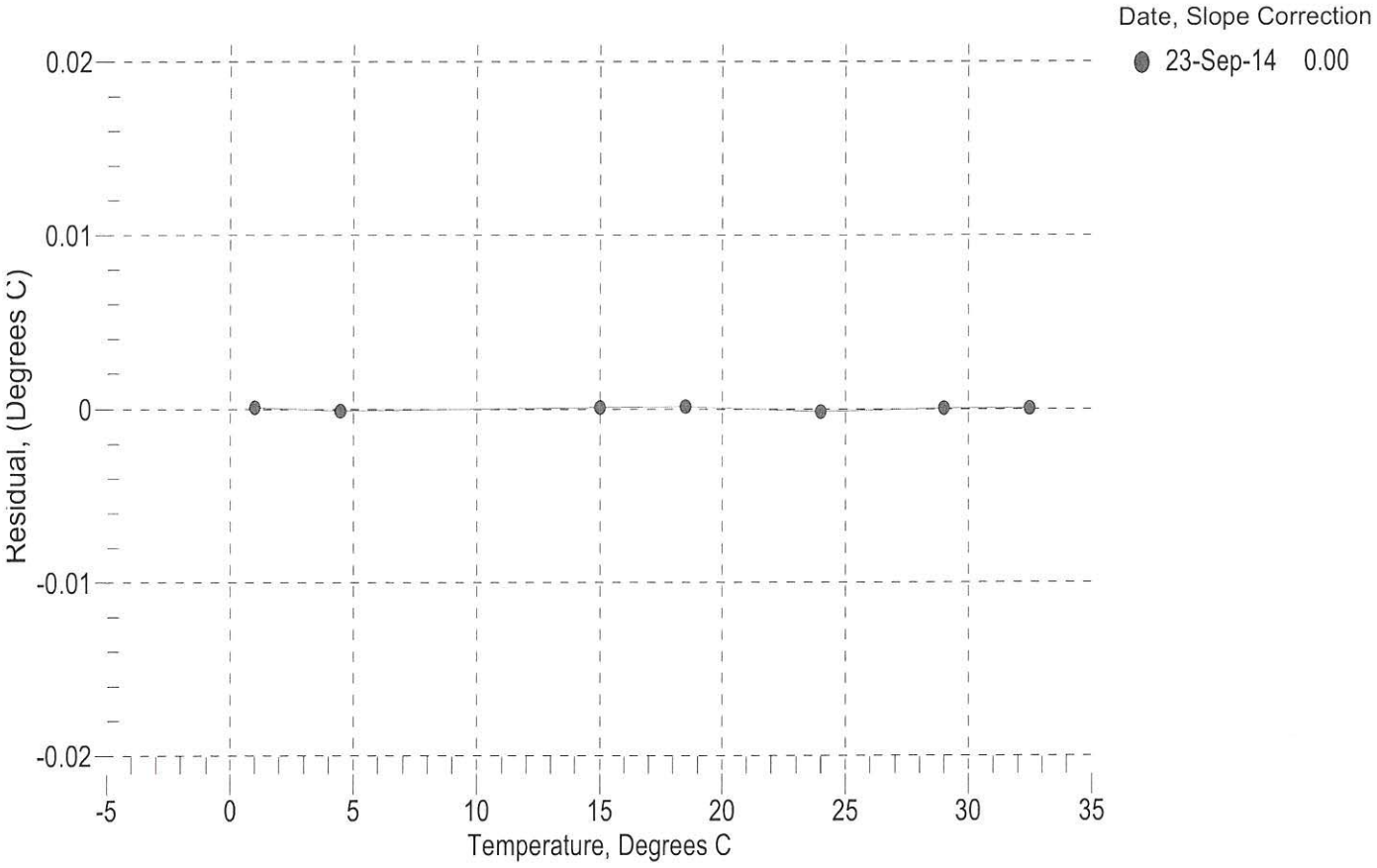
a0 = -1.367772e-004
a1 = 3.146117e-004
a2 = -5.065285e-006
a3 = 2.180317e-007

BATH TEMP (ITS-90)	INSTRUMENT OUTPUT	INST TEMP (ITS-90)	RESIDUAL (ITS-90)
1.0000	564038.8	1.0001	0.0001
4.5000	482535.8	4.4999	-0.0001
15.0000	308095.3	15.0001	0.0001
18.5000	266958.0	18.5001	0.0001
23.9999	214406.5	23.9997	-0.0002
29.0000	176737.5	29.0000	0.0000
32.5000	154898.0	32.5000	0.0000

Temperature ITS-90 = $1/\{a0 + a1[ln(n)] + a2[ln^2(n)] + a3[ln^3(n)]\} - 273.15$ (°C)

Residual = instrument temperature - bath temperature

n = instrument output



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CALIBRATION DATE: 23-Sep-14

Slocum Payload CTD CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

g = -9.877144e-001
h = 1.523432e-001
i = -2.379939e-004
j = 4.083202e-005

CPcor = -9.5700e-008
CTcor = 3.2500e-006
WBOTC = 7.5185e-007

BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2549.11	0.00000	0.00000
1.0000	34.7066	2.96748	5097.88	2.96748	0.00000
4.5000	34.6868	3.27371	5290.94	3.27371	-0.00000
15.0000	34.6444	4.25275	5864.99	4.25275	0.00000
18.5000	34.6349	4.59689	6053.60	4.59690	0.00001
23.9999	34.6243	5.15320	6346.35	5.15320	-0.00000
29.0000	34.6183	5.67353	6608.14	5.67352	-0.00001
32.5000	34.6139	6.04467	6788.53	6.04468	0.00000

f = INST FREQ * sqrt(1.0 + WBOTC * t) / 1000.0

Conductiv ity = $(g + h * f^2 + i * f^3 + j * f^4) / (1 + \delta * t + \varepsilon * p)$ Siemens / meter

t = temperatur e[°C)]; p = pressure[decibars]; δ = CTcor; ε = CPcor;

Residual = instrument conductivity - bath conductivity